

HIGHLAND WATER  
RESOURCES CONSULTING INC.

Water Resources Solution



0000035651

11/29/05

Arizona Corporation Commission  
Commission Engineer  
1200 West Washington  
Phoenix, AZ 85007

Attention: Marlin Scott, Jr., Utilities Engineer  
Steve Olea, Assistant Director Utilities Division

Highland Water Resources Consulting  
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Payson, AZ 85547

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**RE: ACC Docket No. W-03512A-03-0279 -- "2005 Report by Pine Water Co., Inc.  
on Water Supply Alternatives, November 10, 2005"**

Gentlemen,

As I believe you are aware, I am both the Registered Professional Geologist and Principal of Highland Water Resources Consulting Inc. "HWRC" (formerly Arizona HydroSource Inc.) and the Water Resources Advisor/Hydrogeologist for the Town of Payson. Within this letter, I am responding to the above referenced document as HWRC, the consultant to the Strawberry Hollow Domestic Water Improvement District which is frequently referred to in the Report, especially within alternative #20. I am also representing myself due to the many references to "Ploughe", such as in alternative #17 and to clarify some confusion over my involvement in the development of mapping products. This response should not be construed as to represent comments from the Town of Payson or the Mogollon Rim Water Resources Management Study "MRWRMS" for which I am the technical coordinator and advisor. If you desire a response from the Town of Payson or the MRWRMS please let me know and I will notify the proper individuals immediately.

Thus, in response to the November 10<sup>th</sup>, 2005 report by Pine Water Co., Highland Water Resources Consulting Inc., wishes to submit the following clarifications for your consideration.

**In regard to Section I item C, Pages 6-7 of the report:**

HWRC would like to congratulate Pine Water Company for their success in making it through the "100 Day War" of 2005. It should be noted, however, that their success comes on the heels of one of the wettest winters on record. As such, it should not be construed as a sign that water shortages will never happen again in the Pine area. It is thought by most meteorological and hydrological professionals that an occasional wet winter (such as winter 04-05) is expected and represents a brief wet period in an otherwise long-term drought cycle (*2003 Southwest Drought Summit, Flagstaff Arizona*). In consequence, continued development and/or contract acquisition of additional water supplies, particularly in consideration of deeper groundwater sources, is highly encouraged for continued success in addressing future "100 Day Wars". Perhaps Pine Water Co. could entertain or pursue cooperative efforts with developers or improvement districts to obtain deeper groundwater sources to address this need in the near future? HWRC believes such an alternative would maximize improvement of service to customers while minimizing both the risks and costs taken on by rate payers and all parties involved.

**In regard to Section I item H, Pages 11-12 of the report:**

HWRC is in agreement that the Mogollon Rim Water Resources Management Study "MRWRMS" is an ongoing success story and testament to what can be done when regional stakeholders share and develop information for the common goal of sound water resources management decisions. HWRC believes that through this study the realities of the water resources options for the region are being made clearer than ever before and are being made available for all in need of information thru sharing. HWRC also agrees that the importance of winter precipitation as related to the regions aquifers is being further demonstrated by this ongoing study, USGS studies, and is also manifest in Pine Water Co.'s success in getting through the "100 Day War" of 2005 without restrictions being triggered.

**In regard to Section I item J, Pages 13-14 of the report:**

HWRC believes the assertion that (water) "supplies in Pine, Arizona are insufficient to meet demand" is only true in light of currently developed resources and storage and should not be construed as to relate to Pine's existing but undeveloped deep groundwater resources which indeed have been proven to exist as presented in the studies mentioned by Pine Water Co. such as the USGS Mogollon Highlands Study and the SHDWID water adequacy application.

HWRC essentially agrees with the statement that "the implementation of solutions cannot take place in the traditional regulatory environment" when one considers the realities of the associated drilling risks and cost recovery system under which Pine Water Co. seems to operate. This is why innovative approaches are needed to facilitate affordable solutions that ideally involve surface water, groundwater, and reclaimed resources in some conjunctive form. Collaboration with the Salt River Project, developers, and existing water improvement districts is encouraged. With regard to working with developers or existing water improvement districts, the sharing of risk linked with fair and equitable cost recovery agreements may be one way to address the issue sooner rather than later at a significant savings. HWRC would like to encourage Pine Water Co. to pursue such opportunities by reaching out as a partner to such entities in the community.

**In regard to Section II, Alternative #11, Page 26 concerning above ground storage facilities:**

HWRC respectfully disagrees with: (1) the projected costs associated with this alternative which excludes land acquisition, permits, and engineering. (2) The assumption that meeting the minimum storage standards of ADEQ is satisfactory for an area like Pine that experiences seasonal spikes in peak demand far above existing production capability, and (3) the implication that a 2 million gallon storage facility is required to meet peak demands.

First, the total costs to construct above ground storage facilities like that considered have historically been less than \$.50 per gallon for similar facilities recently constructed in the Town of Payson, including land acquisition, permitting, and engineering. In addition, the larger the facility the lower the unit cost typically is due to a larger steel materials purchase at lower cost and the use of the same equipment and expertise as required for smaller tanks. (*Telecommunication with the Town of Payson Engineering Department*) Even with the current high steel and land costs HWRC would be extremely surprised if the total cost were to be more than \$800,000 for a one million gallon storage facility in Pine, particularly if construction were to begin sooner rather than later.

Secondly, the ADEQ standards for storage capacity are "minimum" standards for "typical" water systems. Therefore, it should not be deemed satisfactory that they meet a standard that is not applicable to the realities of seasonal swings in demand and in particular peak daily demands like that occur in Pine.

Third, the cost of this alternative is further exaggerated by specifying 2 million gallons of additional storage capacity when a 1 million gallon facility would be sufficient for addressing peak demands. With this in mind and assuming that a 1 million gallon storage tank were constructed at a total cost of \$800,000; serving an average customer base over the next ten years of approximately 3,000 meters, the calculated "Monthly Ratepayer Impact" would be approximately \$3.00-\$5.00 (depending on depreciation) not the \$20.83 as presented.

**In regard to Section II, Alternative #12, Page 27 concerning water sharing agreements:**

Additional supplies from deeper groundwater sources which are independent of existing shallow aquifer supplies can be and in fact are already accessible (See Exhibit 24, SHDWID water adequacy filing). The issues here, as mentioned previously, are both (a) the "real" need for additional water to meet current and future demands, and (b) a fair and equitable cost reimbursement for such water. HWRC is sure Pine Water Co. would agree that deeper wells cost more to construct, run, and maintain. As such, deeper sources of water have a fair and equitable cost that is commensurate with those realities. Clearly, \$.50 per thousand gallons (*as is paid for existing shallow sources of groundwater*) is not a fair and equitable return for deep groundwater production. Again, I believe that thru cooperative development of such resources and the establishment of a fair and equitable pricing structure for such water, an affordable solution is already at hand.

For example, a water sharing agreement like that being proposed by Strawberry Hollow Domestic Water Improvement District (see Alternative #20 below), at a cost to Pine Water Co. of \$6.00 per 1,000 gallons would increase operation costs of the Company by approximately \$39,000 per year, leading to a modest customer rate increase of only about 5% for approximately 6,500,000 more gallons of water delivered when it is needed most, during the six month demand season from April thru September. The Monthly Ratepayer Impact under this alternative would be about \$1.63 (5% of the average monthly bill of about \$32.50).

**In regard to Section II, Alternative #17, Pages 30-31 concerning deep well exploration (Ploughe Recommendation):**

This alternative directly relates to me and my personal consulting business "HWRC" (noted above and fully authorized by the Town of Payson). A clarification is most definitely in order here as there is clearly confusion over the sources of hydrogeological data and in particular mapping products. The geological maps referenced by Pine Water Co. are the preliminary work products produced entirely by Gaeaorama Inc. for the MRWRMS. The mapping was not conducted or produced by myself (Michael Ploughe P.G.) as an employee of the Town of Payson or as Highland Water Resources Consulting Inc. (HWRC). Neither I, the TOP, nor HWRC produced or developed any of the maps and related cross sections. I am involved in the MRWRMS as a technical lead for the Town of Payson only and provided copies of the MRWRMS maps to Pine Water Co. to assist them in their efforts to compile the most recent and accurate data possible; as would be done for any other entity or person interested in this information. I was happy to discuss with and share this information with Pine Water Co..

It should be further clarified also that the Strawberry Hollow Domestic Water Improvement District has voluntarily shared information it had developed years before the formation of the MRWRMS. The SHDWID wished to aid in the efforts to define water resources options for the Pine area and so shared information. Also notable is that the mapping and associated data produced for and presented within the water adequacy application was generated by Arizona HydroSource Inc. (now Highland Water Resources Consulting Inc.) and represents several years of data development.

Additional clarification is in order with regard to the estimated costs associated with the drilling of deep wells into the deep regional aquifer below the Pine area. In HWRC's experience, the worst case total cost to construct a viable 8 inch production well in Pine would be no more than \$300,000. In reality, such a well should cost less than \$160,000. In addition, the total depth of wells being set at 1,800 feet is about 400 feet deeper than necessary for the majority of Pine. This unnecessarily adds to the costs. So too, as one proceeds eastward across Pine, the groundwater elevation rises. True, the groundwater elevation of the deep regional aquifer is about 4,600ft. thru the center of Pine but may be at a higher elevation of only about 4,800ft. (200ft shallower) at the eastern edge of Pine (See Exhibit 24, Figure II).

The representation that the installation of one deep well would cost close to \$4 million dollars is extremely inflated. The report assumes an outrageous unit drilling cost of \$2,156 per foot for a deep well in Pine. This is completely absurd. Utilizing conservative figures is always a good idea for budgeting purposes; however, \$4 million dollars per well in Pine is outlandish and is far too conservative by a factor greater than 10 times. It is HWRC's opinion, based on over ten years of experience with drilling in the region, that if three (3) wells were drilled in the proper locations, **total costs would be less than \$1 million (total, not each)** with at least one well coming in with significant production capability.

Further clarification is in order relative to the SHDWID application for an assured water supply (Exhibit 24). Within the Pine Water Co. discussion, it is assumed that deep wells will produce no more than 40gpm, apparently based on the SHDWID report. Yet, within the SHDWID adequacy report it is quite clear that the well is capable of much more than 40gpm. In fact, the well's specific capacity (a measure of a wells capability to produce groundwater in gallons per minute per foot of drawdown – the higher the number the better the well and aquifer is) was found to be greater than 3gpm/ft. Typically, wells in the Pine area have a value of less than 1gpm/ft. This means that, in theory, if the deep well was to pump 300gpm the water level in the well would only drop 100 feet. Therefore, it is likely that the well is capable of more than 300gpm and certainly 100gpm. However, the small diameter well construction that was utilized for exploratory purposes prohibits the pumping of more than 100gpm from the well at this time. Still, the SHDWID well is a huge success and points to significant opportunities in the Pine area or even at the SHDWID well site, should reconstruction be considered.

In terms of utilizing deep wells it must be remembered that: (1) they can be located right where the water is needed (within the Pine community, not Strawberry), (2) they can be pumped directly into the local water mains that already exist without incurring significant costs associated with building and operating new distribution mains of a mile or longer to connect to existing infrastructure such as the Magnolia pipeline, (3) they can affordably augment the supply with a new and independent groundwater source, and (4) with two independent groundwater sources (deep vs. shallow) they may be utilized together such that demands on either source can be maintained at sustainable levels for long-term adequacy.

**In regard to Section II, Alternative #20, Pages 32-33 concerning the Strawberry Hollow Domestic Water Improvement District Water Adequacy Application:**

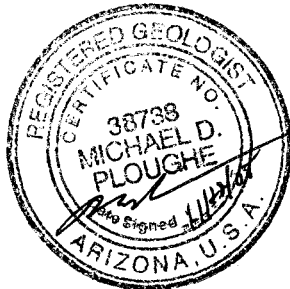
Clarification is in order as to the degree of "incompleteness" of the assured water supply application and report per ADWR's October 19<sup>th</sup> 2005 letter. In the application (Exhibit 24) within the cover letter it is clearly stated up front to ADWR staff that two of the additional documents required are currently being processed. These are two of the six items mentioned in the October 19th letter from ADWR staff. Since the letter was received, it has been discussed with ADWR staff's understanding that three of the four remaining items are in fact within the application and simply required minor clarification and/or additional supporting documentation per ADWR process. The "incompleteness" letter is typical of most ADWR filings and is simply part of the process. Highland Water Resources Consulting is most confident in the ultimate success of the application and is anxious to work with ADWR staff thru their process.

The representation that "the report does not disclose the total sustained yield in excess of demand of SHDWID" is misleading. Projections presented within the SHDWID adequacy report clearly demonstrate a sustainable yield of no less than 46gpm from the deep groundwater source. In addition, as explained in the application, there are 15gpm available from the shallow well, making a total of 61gpm available to support the claim of "100 year adequacy". This 61gpm volume is more than four times the committed demand of 15gpm required at build-out for the SHDWID. With the District only requiring ~15gpm, the remaining ~46gpm is the sustainable yield surplus that is available from the SHDWID wells in their current state. However, the SHDWID wishes to hold some production in reserve, as is prudent. Therefore, 25gpm is being considered as available surplus on a seasonal basis.

In conclusion, HWRC is excited about the recent strides that have been made toward developing real opportunities for affordable solutions which address the water resources challenges in the Pine area. Regionally based partnerships involving the Salt River Project, local water districts and providers, Gila County, ADWR, USGS, Bureau of Reclamation, and others are making huge strides towards developing reality based solutions. Ultimately, HWRC believes that conjunctive use strategies should be developed for the responsible utilization of existing and future water resources of the Pine area. It is HWRC's opinion that the most affordable and viable alternatives, at this time, are (A) the continued development of the deep regional groundwater source within the community of Pine, (B) the construction of an above ground storage facility (500,000 gallon to 1 million gallon) in concert with alternative A, and (C) working with SRP towards exchange of Pine Water Co.'s CAP allocation to bring some form of surface water into the areas supply portfolio.

HWRC is proud to have played a role in addressing the water supply challenges in the Pine area and appreciates your consideration of the above information. Thank you for your time.

Regards,



Michael Ploughe P.G.  
Highland Water Resources Consulting

cc:

Loren Peterson – SHDWID  
Robert Hardcastle – Pine Water Co.  
Harry Jones – Gila County  
Leslie Meyers – Bureau of Reclamation  
Buzz Walker – Town of Payson Water Department